THE EFFECTS OF FREE TRADE AREA ON SOUTH AFRICAN AGRICULTURE: IMPACT ON EXPORTS

By

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Chapter I

Introduction

Overview

Problems that faced South African government on the eve of 1994 democratic elections were immense. These problems ranged from slow growth, rising unemployment, poverty, racially skewed provision of social and physical infrastructure, declining trade shares in the world and restoring good reputation in international markets. The economy was growing at a rate slower than the population growth, inflation was in double digits, and inequality of income distribution was one of the worst in the world.

Labor absorption (employment of first entrants in the labor market) in the formal sector from mid-1970s to 1994 plummeted from 60% to 40% (Habib and Padayachee, 2000). Net job creation over this period amounted to just 440,000 compared to the growth of five million in the economically active population. In 1970 agriculture employed 30.6% of economically active population, but declined to 13.2 % in 1994 (OECD (a)). The post-election era did very little to correct the unemployment problems. Net job losses in 1996 and 1997 were 57,000 and 86,000, respectively (Department of Finance). Most of these losses were in the primary sectors (agriculture and mining) of the economy.

Economic growth had slowed markedly since the early 1970s, reversing the robust expansion that was experienced in the 1960s. From 1948 to the late 1970s, South Africa pursued an import substitution economic strategy that facilitated the expansion and development of the country's manufacturing and

state investment in key sectors (Habib and Padayachee, Schneider). During this period, manufacturing was the principal contributor to GDP, even though it was still closely linked to mining and energy sectors (Habib and Padayachee, 2000). South Africa was still considered an exporter of primary commodities. This is because South Africa's competitiveness in manufacturing is regional, but not global.

South Africa's policy has since the 1990s switched focus to the creation and development of manufactured exports (Department of Finance, 1998 and Ministry of Agriculture and Land Affairs, 1998). This was based on the hypothesis that economic growth depends significantly upon whether the country becomes internationally competitive in this area. It was then that trade liberalization was taken more seriously in an attempt to widen the market base. The rationale for the trade liberalization initiative was to create a competitive environment in which South African firms and industries are forced to be competitive on global terms. South African firms and industries were required, by the changing policy environment and by international competition to improve their export performance, as well as the production and marketing efficiencies.

To facilitate growth in exports, South Africa made efforts to increase market access for its products. South Africa signed the Marrakesh Agreement on agricultural trade in 1994. The agreement, among other things, required elimination of non-tariff barriers and reduction of tariffs. This was followed by the signing of the development and co-operation negotiations with the European

Union in 1999. The agreement leads to establishment of free trade between the two sides in 12 years.

The performance of agricultural exports in the EU and world markets signals an opportunity for South African commodities in world markets. This opportunity came mainly through increased access into world markets, which were a result of changes in policy environment. The policy changes may have increased market access, but they may not necessarily affect the demand for the exports.

This study examines those forces that affect demand for South African fruit commodities in the EU market. The main focus will be on the performance of exports against other suppliers of fruits to EU, from both the northern and southern hemispheres. Suppliers from the northern hemisphere include the United States and Turkey. The three competitors from the southern hemisphere in the study are Chile, Argentina and New Zealand. The fruit products being studied are grapes, pears and apples.

Research Objectives

General objective

The main objective of this study is to examine the fundamental economic determinants of the South African agricultural exports to the European Union in the context of trade liberalization.

Specific objectives

1. To analyze the impacts of economic factors influencing the European Union demand for South African fruits.

2. To examine the impact of price competition between South African fruits and fruits from other suppliers.
3. To analyze the effects of policy changes on market shares of various fruits.

Many factors may have an impact on the structure, quantity and value of exports, including historical, cultural, economical, political or behavioral. In this study, economic factors are being considered. The price of commodities and expenditures on the commodities are expected to play a major role in explaining the variation in market shares in the EU markets. Price competition is likely between South Africa and its southern hemisphere counterparts due to the fact that suppliers compete for market share during same period of the year due to the same harvest period. Trade liberalization policy is expected to have a positive effect on market shares of the products. The study is important from a policy perspective, as trade liberalization constitutes an important element in the government's effort to boost the underlying supply of the economy.

Organization of the study

This section describes how the rest of the study is organized. Following this introduction is a conceptual framework in chapter II, discussing theory of international trade. Chapter III reviews the literature on policies and the trade agreement. Mathematical and theoretical aspects of the model are descussed in chapter IV, while chapter V presents the data sources and the results. Chapter VI offers a summary and some concluding remarks.

CHAPTER II

Conceptual Framework

Changes in agricultural protection brought about through multilateral and regional trade agreements have different effects on various interest groups. Removal of import barriers by importing country that lead to a lower domestic price will increase the welfare of consumers, decrease the welfare of producers and decrease government revenue (Reed). It follows that domestic production will decrease, while domestic consumption and imports will increase as a result of lower domestic price. Because of these outcomes, most countries are very cautions when they liberalize their markets or enter into any trade negotiations.

International trade is based on the existence of excess demand and excess supply of commodities among nations. Excess demand for a certain commodity in a country is the gap between the domestic supply and domestic demand of the commodity in question. To meet the gap, the country imports the commodity from another country where the domestic supply exceeds the domestic demand for that commodity. The price of the commodity should be lower in the exporting country compared to the importing country. The concepts of international trade and the welfare analysis of trade are presented in the following sections.

Theory of comparative advantage

A conceptual model of the law of comparative advantage and gains from trade is given in figure 1. The model includes two countries, the EU and South Africa and two agricultural commodities, meats and fruits. Given the farm

resources, the two countries will produce a combination of meats and fruits along their production possibility frontier curves P. In the diagram, I_0 and I_1 represent the indifference curves of two countries. In the absence of external trade, given their resource endowments, the highest indifference curve that each country can reach is I_0 and tangency of I_0 to production possibility frontier curve. In each country, point A, represents the production and consumption of the combination of fruits and meats. In other words, at point A the marginal rate of substitution in consumption is equal to the marginal rate of transformation in production or the slope of I_0 is equal to the slope of P. The slope of line T_0 indicates the equilibrium price ratio of both commodities in each country. With the assumption of full employment of all available resources in each country, the line T_0 measures the forgone units of fruits in order to produce one additional unit of meat. The slope of T_0 (in the absence of trade scenario) is steeper in the EU compared to South Africa. This means that in the EU the price of fruits is higher than the price of meat. The opposite is true for South Africa. The flatter the slope of the price line in South Africa shows that the price of meat is higher than the price of fruits as compared to the EU.

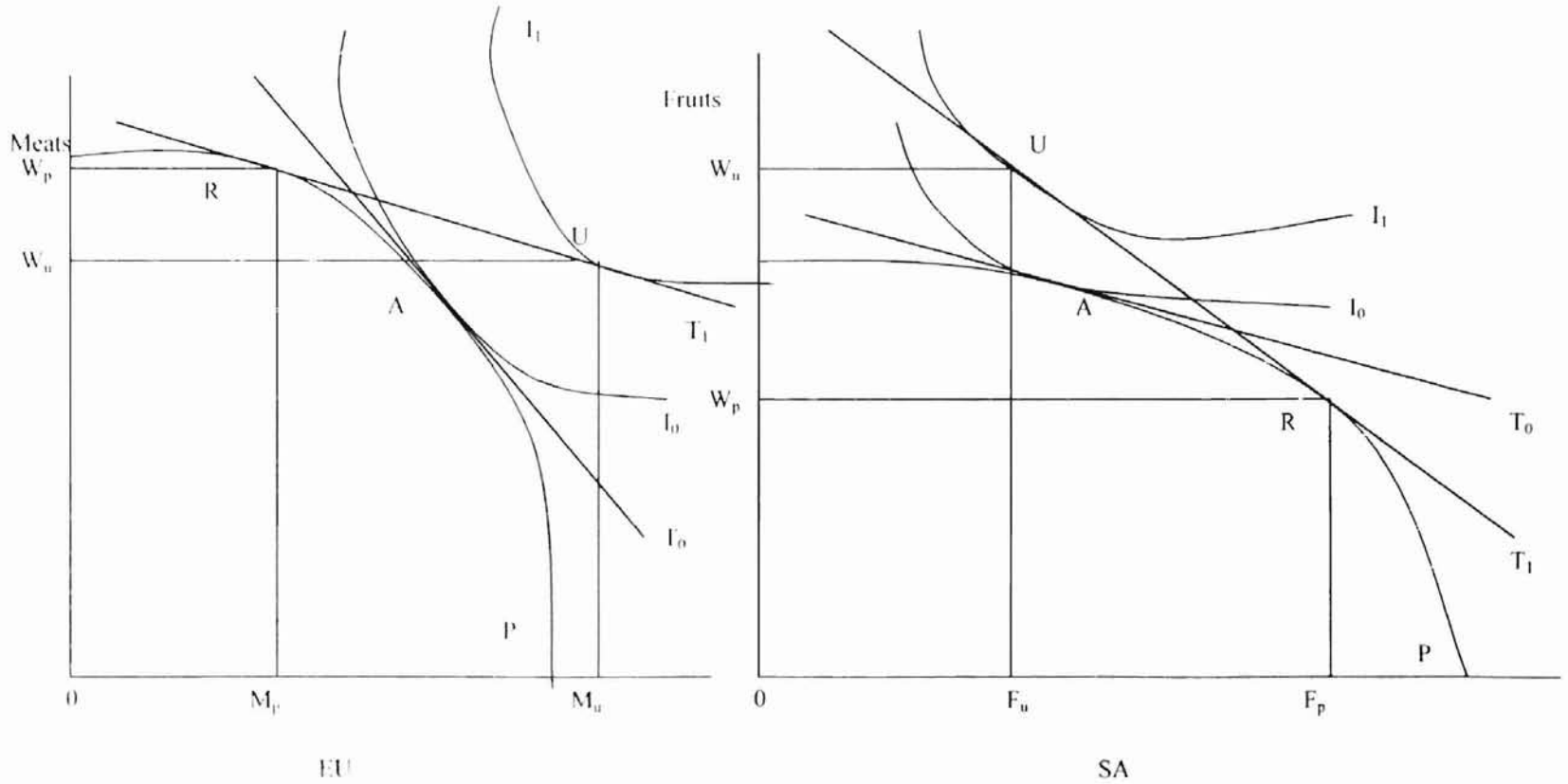

Figure 1: Conceptual model of comparative advantage and international trade

The relatively higher price of fruits in the EU and meats in South Africa are the result of differences in their production capabilities rather than consumer preferences. The EU has a comparative advantage in meat production and South Africa has a comparative advantage in production of fruits, although the EU can produce both meat and fruits at a lower cost compared than South Africa. Also, if the EU can produce meats, fruits or both at a lower cost compared to all other countries in the world then the EU is said to have an absolute advantage in production of meats and fruits. Both the EU and South Africa can still benefit from trade even if the EU or South Africa have an absolute advantage in production of commodities. The absolute advantage theory can be true for any country and any commodity in the world. However, only comparative advantage is necessary for an economy in order to gain from international trade.

As shown in the diagram with international trade, the societal indifference curves of both countries move to higher levels (from I_0 to I_1). Both countries will produce at point R where the new trading price line T_1 is tangent to the production possibility curve. Consumption will take place at point U in both countries where T_1 is tangent to I_1. This situation represents a pareto optimum because the same price line is tangent to the production transformation curve (representing an equal marginal rate of transformation in production) and an indifference curve (equal the marginal rate of transformation in production). As shown in the diagram, the EU produces M_p and consumes M_u of meat. The

difference between the two quantities ($M_p - M_u$) is the net export from the EU and the net import into South Africa. Similarly, the difference between the quantity of fruits produced and consumed in South Africa ($F_p - F_u$) is the net export from South Africa and net import to the EU.

Comparative advantage and trade lead to a greater specialization in the production of meat in the EU and fruits in South Africa and a higher indifference curves for both countries, which means comparative advantage and trade benefit both countries. Although the prices of both commodities in both countries are assumed to be the same in the analysis, in reality however, prices vary from country to country because of transportation costs and institutional barriers imposed on trade such as quotas, tariffs, subsidies, and domestic price supports. This variation in pries results in the rejection of the theory of comparative advantage that is based only on a relative production costs. Since the variation in prices across nations is generally observed, comparative profits rather than comparative advantage is more complete concept to be the basis for international trade. In application, where the reality of distortionary government policies exists, this modern theory is particularly important. The theory of comparative profits includes production possibilities, consumer preferences, and trade barriers among nations in a real world situation. Hence, a country will have a comparative advantage in exporting a commodity if it receives the highest return per unit of fixed resources in the real world situation.

Welfare analysis of trade

The welfare analysis of trade is explained in a partial equilibrium model in figure 2. In order to simplify the presentation of theoretical framework, a one commodity two-country trading scenario is assumed. Homogeneity and competitive conditions in both countries are assumed. The transfer cost and trade barriers are ignored. The three-panel diagram explains the welfare impact of trade on exporting country A and importing country B. The central figure represents the world market W. As seen in the diagram, in the absence of trade, country A produces Q_A of meat at a price P_A. The quantity and the price of the same commodity in country B are Q_B and P_B, respectively.

In the presence of trade, excess supply E_s from exporting country (the quantity that exceeds the exporting country's demand) and the excess demand E_D of the importing country (the quantity demanded in excess of domestic supply in importing country) and the international price are shown in the world market. The international price P_W and the trade volume Q_W are determined at the point where the E_D curve intersects the E_s curve. The international price (which is higher than the exporting country's domestic price before trade and lower than the importing country's domestic price prior to trade) leads to more production and less consumption in the exporting country and more consumption and less domestic production in the importing country. As a result of trade, consumers in the exporting country lose in the consumer and producers gain; however, the gain in the producer surplus more than offsets the loss in consumer surplus by area X shown in figure A. Further, in the importing country, producers are worse

off and consumers are better off but the gain in consumer surplus more than offsets the loss in producer surplus by area Y shown in figure B. Trade yields a net gain to both exporting and importing countries.

Impacts of domestic trade policies

In the material presented above, no trade barriers among countries were considered. That is, an assumption of no government interventions such as tax, subsidy, and quota in the process of international trade was implicit. In reality, however, governments do formulate and implement domestic policies in order to improve producer, consumer and social welfare. For example, the adoption of an import tax, import quota, and export subsidy can lead to an increase in producer welfare. On the other hand, policies such as an export tax, export quota and an import subsidy can result in increased consumer welfare. The analysis of domestic policies can be presented by the distinction of large and small countries. Large and small reflect the relative size or market share (for a commodity analyzed) of a country in the world market rather than the geographical size, population or national income of a country.

Large versus small countries

The relative volume of imports and exports of a small country compared to a large country is not significant enough to affect through its policies the world price of the commodity for which the country is classified. To the contrary, a large country through its implemented policies does affect the world price of the commodity for which the country is classified. Therefore, it is important to distinguish the impacts of a large and a small country on domestic and

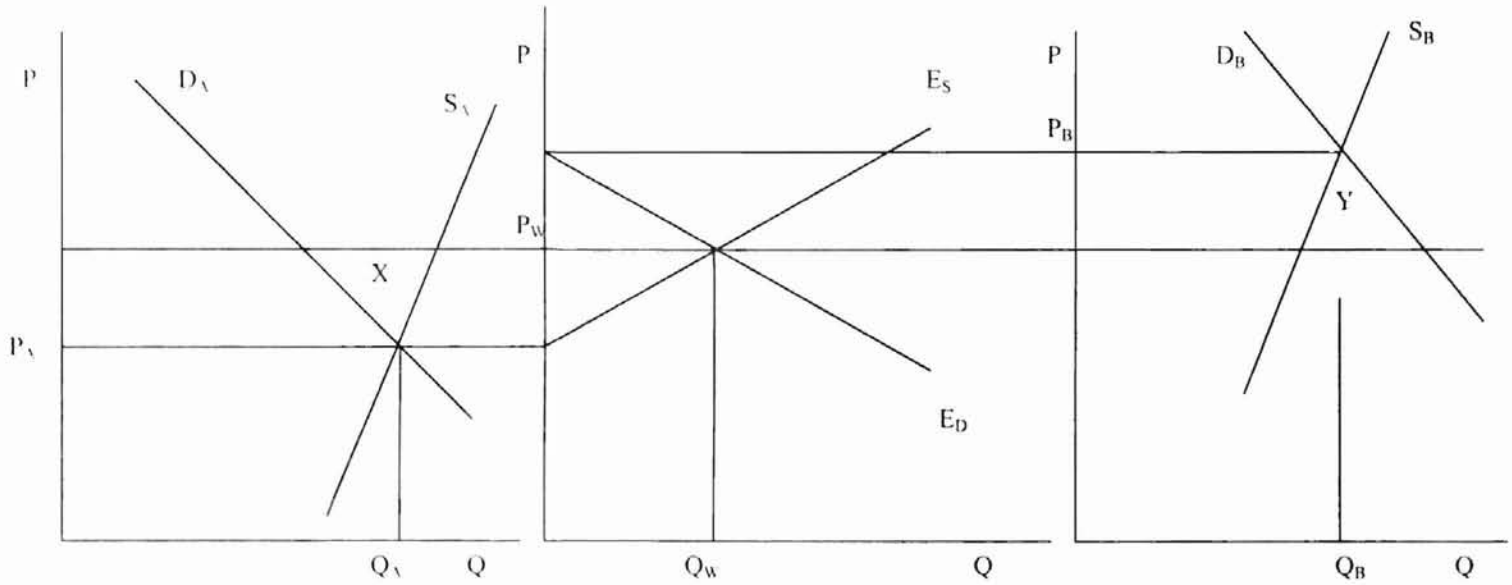

Figure 2: Trade between two countries

A) Domestic demand and supply curves of Exporting country; W) Excess demand and supply in the world market; B) domestic demand and supply of importing country

international markets. A specific country may be classified as a large country with respect to one commodity and small in terms of another commodity because large and small refer to specific commodities. Also, a country that is categorized as a large country in some years may be classified as a small country in others because the level of production of commodities varies over time as well as across geographic regions.

The assumptions of this analysis include a constant marginal utility of money among all producers, consumers, and the government: one dollar gain to producers exactly offsets one dollar loss to consumers and the government and vice versa. The world price prevails across all nations until after the adoption of certain policies by one or more countries that yield a difference between the world and domestic prices. It is also assumed that imported goods are perfect substitutes for domestically produced goods.

In this section the analysis of classical international trade theory was explained. This explanation dictates the direct quantitative benefits and costs that can be derived after the adoption of free trade. Although this study will not estimate the quantitative impacts of the trade distortion policies, the theoretical background demonstrates the difference between the free versus restricted trade. Prices and income are important variables in determining the analysis of import demand for a commodity. These variables will be used in the estimation process of the model for this study.

CHAPTER III

Literature Review

Introduction

This chapter describes the various policies and changes in policies over in the years in both the European Union and South Africa. The background of this section discusses South African situation with regard to trade issues. South African policies, going back to 1936 are summarized, and details of Common Agricultural Policy (CAP) are included. Events and issues that led to the signing of South Africa-EU trade agreement and policies of other countries conclude this chapter.

Background

South African economy is emerging from an era of sanctions, distortionary policies and declining growth rates since the 1960s. Attempts to change things around were made clear in the early 1990s when the country was getting acceptance and recognition from the international communities. Then, growth rates and performance in international trade started to resemble that of an emerging country.

Although the long term trend showed that South Africa's trade share in the world is still declining (Figure 3), sign of recovery were clearly visible since the mid 1990s. The trade share in the world for agricultural commodities increased by about 6% from 1994 to 1998 (NDA). During the same period, agricultural exports grew in world market share by 7%. These increases in agricultural market shares varied by commodities. Although sugar and maize have been the

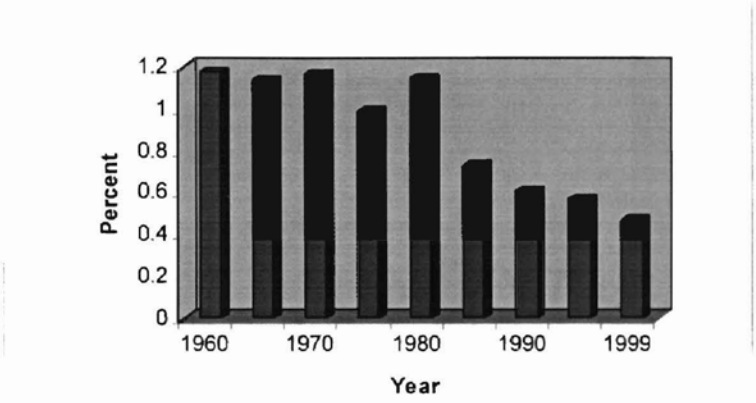

Figure 3: South African total trade share in the world (in value)

two most important export commodities in the last five years, the fastest growing exports are fruits (as a group) and wine and spirits (figure 4).

In terms of contribution to the total trade, agriculture's total export value was 8% to 10% during the period of 1994 to 1998. The agricultural share in total imports varied between 6% and 7% during the same period. The value of exports exceeded value of imports during this period by percentages that varied between 19% (1995) and more than 60% (1998). South Africa has been a net exporter of agricultural commodities since the 1970s (figure 5).

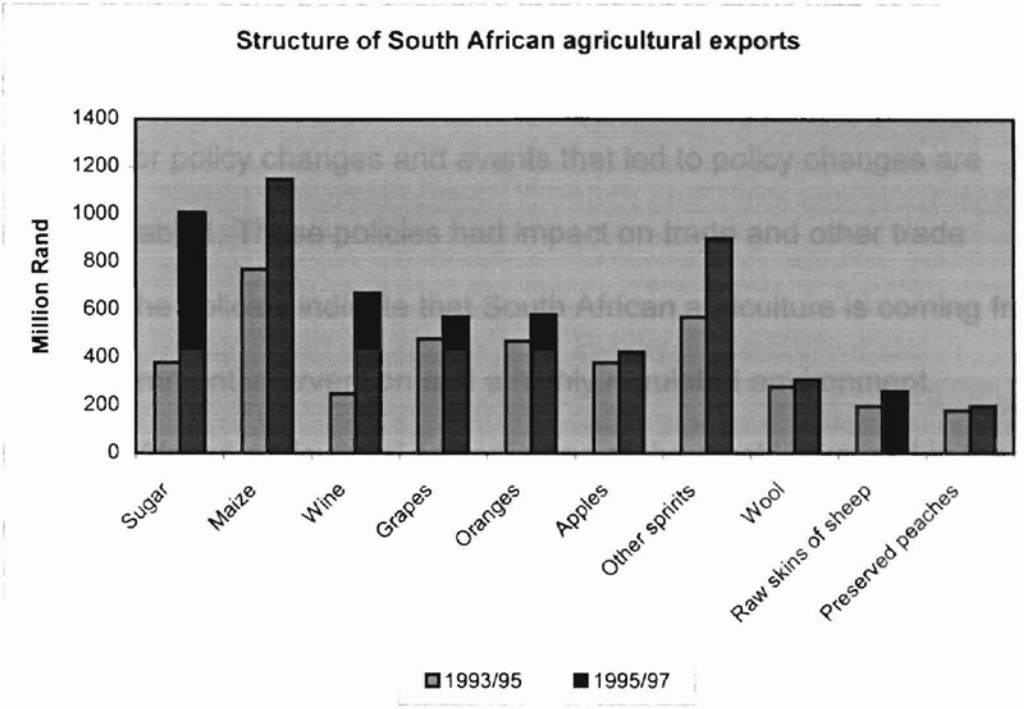

Figure 4: Structure of South African agricultural exports.

Figure 5: Imports and exports of agricultural commodities (1970-1998)

South African policies have been changing throughout to move with changing times, but most importantly, to keep the economy in the right direction and competitive. Major policy changes and events that led to policy changes are summarized in Table1. These policies had impact on trade and other trade related issues. The policies indicate that South African agriculture is coming from a history of government intervention and a highly regulated environment. Recently, South African agricultural sector is one of the most liberalized in the world, with very little support and intervention from the government.

Table 1: South African Policy reforms in trade

Year	Policy	Description
1936	Marketing Act	Formation of control Boards, introduction of fixed pricing
1960s and 1970s	Import substitution and Export promotion measures	High tariffs and extensive import controls
1980's	More export promotion measures	Export promotion without liberalization of import regime. Several export schemes introduced.
1990	General Export Incentive Scheme (GEIS)	Tax-free export subsidy with payments varying according to the value and degree of manufacturing; Combines different export promotion schemes.
1994	Signing of WTO agreement.	Removal of non-trade barriers and reduction of tariffs
1996	Marketing of Agricultural Products Act	Replaces 1936 Act, minimum government intervention and removal of controlling Boards
1997	Phase out GEIS	▪ In 1995 the magnitude of support was scaled down and payments were taxable, ▪ In 1996 it was limited to fully manufactured exports, ▪ In 1997 it was entirely eliminated
1999	Signing of SA-EU trade agreement	Establishment of free trade with EU in 12 years

Source: NAMC, NDA, IMF, ABSA and European Commission

EU policies

Agriculture in the EU still plays an important role regardless of its low contribution to the GDP. In 1999, agriculture's share of GDP was less than 2%. The sector's share of employment is over 5% (OECD (b)). In 1996, food accounted for about 17 % of total consumer expenditure. In 1999 trade in agricultural commodities accounted for approximately 7% of EU's total exports and same amount for total imports (Europa).

EU is the largest world importer of agricultural products and also the second largest exporter (El-Agraa) after the United States. It is also the most significant and influential of international economic integration scheme. EU comprises some of the most advanced nations in Western Europe, and it is also the oldest such scheme. Agricultural production, consumption and trade in the EU are strongly influenced by government programs and policies under the auspices of Common Agricultural Policies (CAP). Under CAP, EU was transformed from the world's largest importer of temperate zone agricultural products into the largest exporter of food and agricultural products (USDA(a)). CAP still remains a dominant influence on international agricultural markets and trade.

The basic objectives of CAP were to increase agricultural productivity, ensure fair standards of living for farmers, stabilize agricultural markets, provide certainty of supply and ensure that supplies reach consumers at a reasonable price (Reed). But CAP also succeeded in ensuring high and stable prices, which in turn encouraged investment as well as rapid and continuous adoption of

production technology. As a consequence of more production, surpluses accumulated from one year to another. This growth in agriculture continued, but could not be sustained without exports. Exports had budget consequences, and due to high internal prices, EU had to institute subsidies.

Agricultural payments, in the form of export refunds and export subsidies, were taking over 60% of EU's budget each year (Reed). This was a total of up to $20 billion each year in the late 1980s. In 1996, EU accounted for over 80% of the world agricultural subsidies reported to World Trade Organization (USDA(a)) measured in producer subsidy equivalence (PSE). EU's budget for agricultural market support and direct aid remains high, amounting to $46 billion in 1998, which was over half of the total EU budget (USDA(a)). In 1996 budget cost in direct payments to producers accounted for 70 percent of all EU expenditures for market support and direct aid. Total spending on agriculture increased by 28% between 1991 and 1997 (USDA(a)).

Due to these budgetary pressures, and outside pressure from trade partners, EU started looking at some ways of changing or reforming their policies. During the Uruguay Round of GATT, EU was in the process of changing policies. A comprehensive plan was developed in 1991 to reform CAP. This plan called for reductions in price supports for essentially all temperate agricultural products. EU was also forced to bind its tariffs as a result of Uruguay Round of GATT agreement. EU has met the requirements on internal support and tariff rate reduction. However, EU is yet to meet the required reductions in export support subsidies, which had been extended to 2001.

Recently EU has been contemplating another reform in the form of Agenda 2000. This is a six-year (2000 – 2006) financial package that includes policy reforms and designs to ease enlargement of EU to central and eastern European countries (CEEC) and also to prepare for WTO negotiations. Under Agenda 2000, EU intends to shift from price supports to direct payments and modify supply control measures (USDA(a)). Due to a larger surplus, EU's prosperity depends heavily on access to international markets (Europa).

In the case of fresh produce, EU has been trying hard to comply with the WTO requirements. In 1996, EU agreed on a reform for fruits and vegetables that will reduce the volume of produce that can be withdrawn from the market. This was scheduled to take place over a six-year period. Consequently, this will reduce the value of compensation payable. A greater role in the market management will be granted to producer groups.

In terms of tariffs on fresh fruits, EU complied with WTO requirements by the end of 1999 (USDA(a)). The average tariff on fresh fruits was 21%, which was below the world average on agriculture (58%). This level is also below the EU 's average agricultural tariff of 30%.

By 1999, border measures had already been adjusted under the terms of Uruguay Round agreement on agriculture. During the same year, total amount spent on subsidies is estimated to have declined by 6% compared to 1998 (OECD (a)). These moves are expected to have an increase in supply of fresh produce in the EU market, including from the domestic market. As a result, competition will intensify by the time all these policies are fully implemented.

Another thing that makes competition in the EU market interesting, is the fact the EU is still struggling to bring prices closer to world market levels. The net institutional price in key agricultural sectors is one of the priorities in Agenda 2000. In July of 2000, a proposal by the commission to amend common organization of market in fruit and vegetables was presented. The proposal entailed rationalizing and simplifying the existing arrangements for certain fruits and vegetables. The common organization of markets for fruit and vegetables was reformed to enable producers to meet market expectation in terms of quantity, quality and prices.

The EU-SA trade Agreement

The EU is by far South Africa's largest trade partner, averaging about 44% of its imports, 23% of the South African exports and over 50% of the South African foreign direct investment in the last decade. On the other hand, South Africa accounts for only 2% of EU imports and just above one percent of its exports. For comparison, the U.S. accounted for about 12% of South Africa's imports and 7% of its exports. Japan accounts for 10% of its imports and 6% of its exports.

EU dominated the total trade between the two parties in the last decade (Table 2). On the other hand, South Africa dominated the agricultural trade over the same period. Figure 6 and Table 3 showed a large agricultural trade surplus in South Africa's favor. According to Hecksher-Ohlin model, labor-intensive goods will flow from a relatively less developed country (South Africa in this case) to a more developed country and capital-intensive goods will flow back. This is

Table 2: South Africa's foreign trade by bloc[1] (1990 – 1999).

	EU		APEC		NAFTA		SADC		EFTA		MERCOSUR		ROW	
Year	Exp	Imp	Exp	Imp	Exp	Imp	Exp	Imp	Exp	Imp	Exp	Imp	Exp	Imp
1990	22.6	46.6	19	32.6	3.8	12.1	6.3	1.4	3.3	2.7	0.6	1.8	48.5	15.4
1991	21.6	43	18.5	38.4	3.7	14.7	7.3	1.4	5.7	2.7	0.8	1.8	46.1	13.2
1992	21.2	41.7	18.9	37.7	4.7	14.6	7.9	1.9	8.5	2.4	1	2.3	42.9	14.4
1993	19.3	41.6	18.5	40.2	5.1	14	7.7	2.1	10.2	2.4	1.1	1.5	43.4	12.4
1994	21.9	46.5	20.5	37.4	5.7	12.8	8.7	2.4	7 3	2.7	1.5	2.2	40.3	9.2
1995	27	44.7	24.1	36.7	7.1	13	10.5	1.8	4.1	2.5	1.5	2.2	33	12.4
1996	27.6	44	28.6	37.2	8.8	13.7	11.8	2.2	3.4	2.7	1.5	2.1	27.3	12.1
1997	28.5	42.2	28.5	36.8	9	14	11.4	2.1	2.4	2.3	1.6	2.4	27.8	14.5
1998	32.3	44	26.6	38.6	11.1	14.9	10.7	1.8	3.9	2.9	1.4	1.8	25.4	11
1999	33.5	42.6	28.6	38.3	11	14.6	10.5	2	3.1	2.7	1	1.8	23.5	12.7
Avg	**25.5**	**43.7**	**23.2**	**37.4**	**7**	**13.8**	**9.3**	**1.9**	**5.2**	**2.6**	**1.2**	**2**	**35.8**	**12.7**

Source: ABSA

also supported by the fact that South Africa is considered an exporter of primary products in the global context.

The trend in agricultural trade between South Africa and EU is almost similar to that of South Africa and the world (Figure 6). The gap widens in South Africa's favor from 1995 onwards. South Africa had a trade surplus of about 822 Million ECU (table 3) in 1999. The table also shows that fruit industry has the largest contribution in value terms.

[1] Note: EU = European Union, NAFTA= North American Free Trade Area, SADC= Southern African Development Community, APEC= Asia-Pacific Economic Cooperation, EFTA = European Free Trade Association, Mecorsur = Mercado Comun del Sur (Common Markets of the South) and ROW = Rest of the world

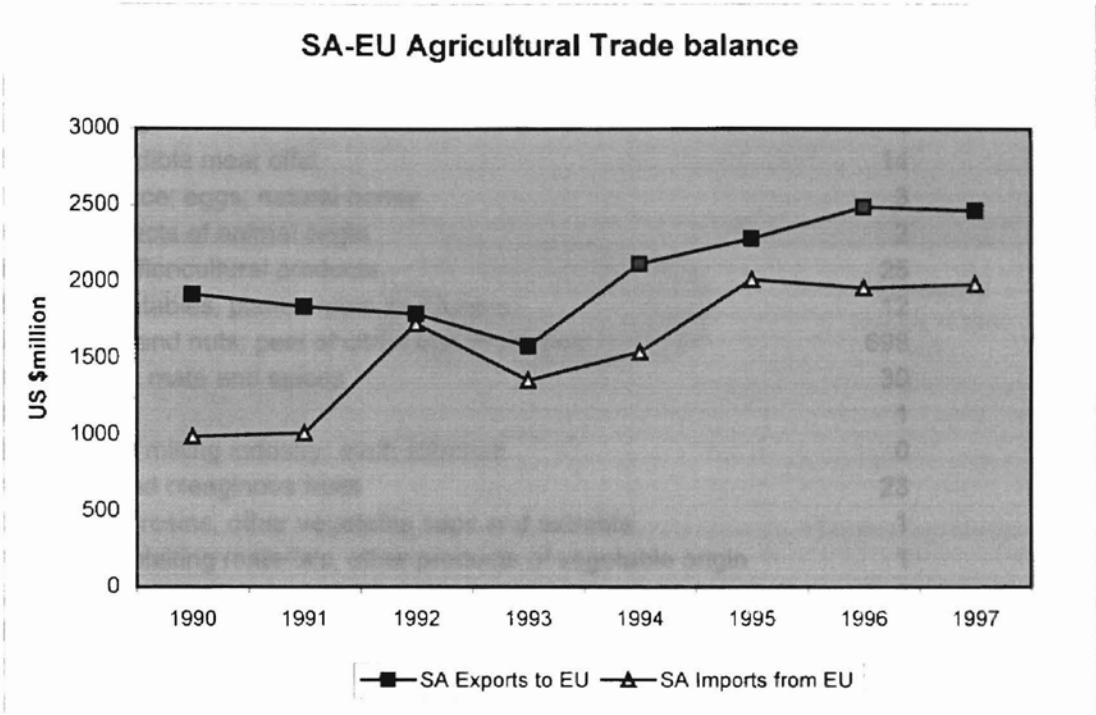

Figure 6: SA-EU Agricultural Trade- 1990 through 1999 (in Million ECU)

Prior to the negations, EU tariffs on imports from South Africa were much lower than South Africa's tariffs on imports from EU (figures 7 and 8). When negotiations started, the tariff weighted averages of EU and South Africa were 1.7% and 11.7%, respectively (OECD, (b)). At that time, only 6% of all South African imports faced tariff line higher than 10%. On the other hand, EU imports had to face tariff lines as high as 40%.

Major part of imports from South Africa (75%) entered the EU free of duty (figure 6). After full implementation by the EU of its commitments within Uruguay Round, scheduled for 2004, as much as 78% of all South African imports will enter the EU duty free. At the end of the transition period set during the negotiation, about 95% of South African imports will enter the EU free of duty.

Table 3: Composition of SA-EU 1999 Agricultural Trade (Million ECU)

Products	SA Exports	SA Imports
Live animals	1	3
Meat and edible meat offal	14	42
Dairy produce; eggs; natural honey	3	13
Other products of animal origin	2	16
Live plants floricultural products	25	5
Edible vegetables, plants, roots and tubers	12	2
Edible fruit and nuts; peel of citrus fruit or melons	698	3
Coffee, tea, mate and spices	30	5
Cereals	1	7
Products of milling industry; malt; starches	0	18
Oilseeds and oleaginous fruits	23	6
Lac; gums; resins, other vegetable saps and extracts	1	6
Vegetable plaiting materials, other products of vegetable origin	1	0
Animal or vegetable fats and oils	3	13
Meat preparations	0	1
Sugars and sugar confectionery	4	5
Cocoa and cocoa preparations	0	5
Preparations of cereals, flour or starch	1	21
Preparations of vegetables, fruit or nuts	87	13
Miscellaneous edible preparations	3	21
Beverages, spirits and vinegar	219	123
Residues and wastes from the food industries	2	12
Tobacco and manufactured tobacco substitutes	2	32
Other agricultural products	104	42
Total - Agricultural products	**1236**	**414**

Source: National Department of Agriculture,

Thus, the trade negotiations will result in extra 17% of imports from South Africa entering EU duty free, but after about six years of EU's compliance with WTO requirements. Whether this margin is significant or makes a difference, is not known yet.

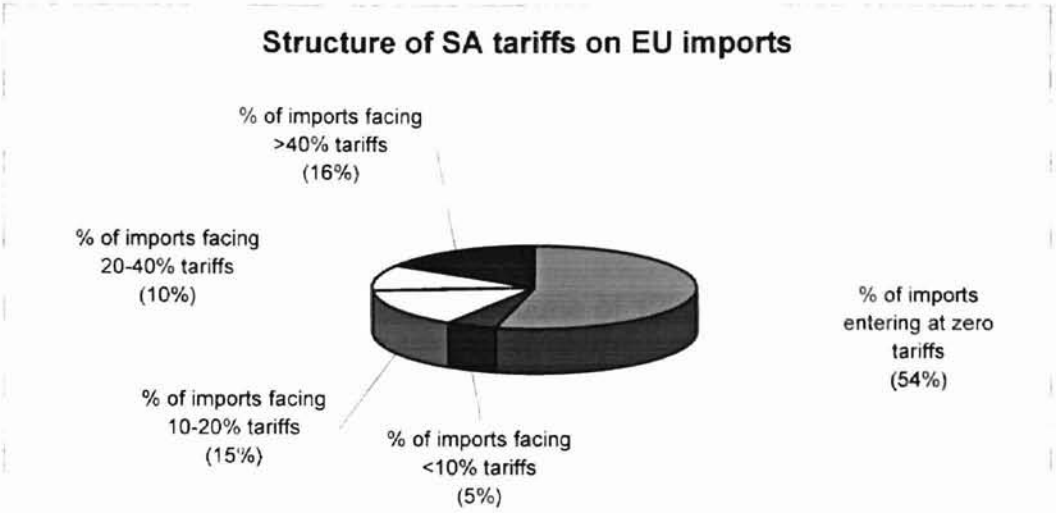

Figure 7: Structure of South African tariffs on imports from EU in 1996

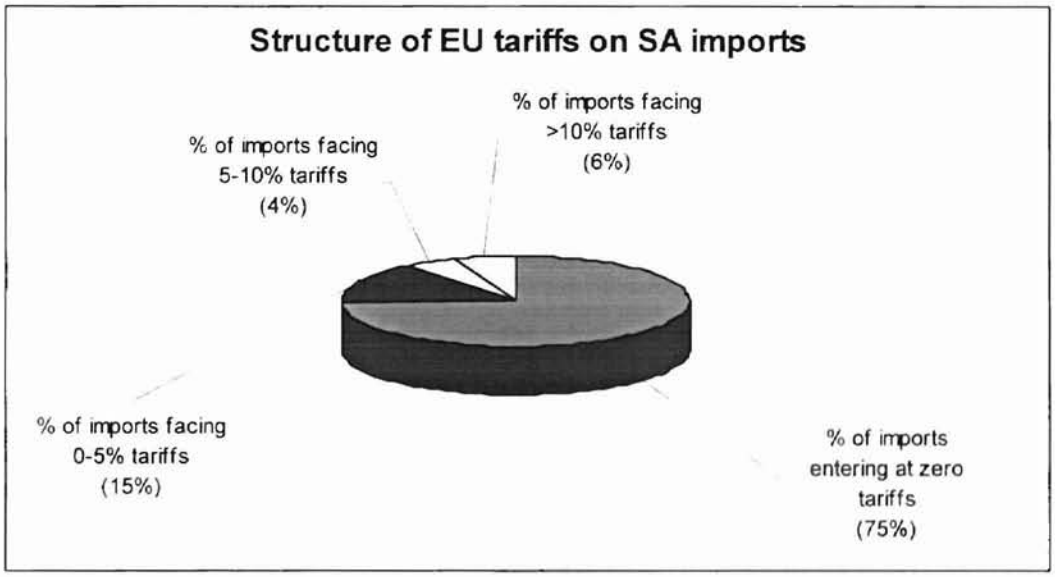

Figure 8:The structure of EU tariffs on imports from South Africa in 1996

Following South Africa's historic transition to democracy in 1994, the EU Council of Ministers called for a package of support measures. EU proposed that South Africa be included in the generalized system of preferences (GSP) and that comprehensive negotiations towards a long-term agreement be initiated. South Africa needed long-term agreement under the terms similar to those under

the Lome` Convention[2]. The request was rejected because according to EU, South Africa does not fit the status of African, Caribbean and Pacific (ACP) country. Instead, EU offered a free trade agreement and a qualified accession to Lome`, excluding trade aspects of the convention. The negotiations for free trade area (FTA) were officially opened in June of 1995.

Based on the difference in development level, the two agreed on the principle of asymmetry. Under this principle, the most developed trading partner, EU in this case should liberalize its imports from South Africa at a faster pace and in a higher proportion than it's counterpart. That is, EU liberalizes most of its South African imports in a relatively short time span, ten years. On the other hand, South Africa is allowed extra two years to liberalize a smaller range of its EU imports. However, in agriculture, the asymmetry was practically reversed, with South Africa eliminating tariffs sooner and to a greater extend than the EU (Table 4).

Both EU and South Africa had to meet certain WTO requirements for free trade. The most relevant of these was that 90 percent of trade between the countries should be liberalized, or free of customs and duties (ABSA, 2000). The mechanism by which EU-SA agreement meets this requirement is shown in Table 4. In addition, EU agreed to grant tariff quotas of about 13% for certain agricultural products at a preferential rate (ABSA, 2000).

[2] The Lome` convention provides for a non-reciprocal duty free access of 95% of the exports of ACP countries, with exception for products under the CAP.

Table 4: Percentage of zero duty imports from other party, by the end of transitional period, based on 1994/96 trade volumes

	Agriculture	Industry	Total
South Africa	81.0%	86.5%	86.3%
European Union	61.4%	99.98%	94.9%

Source: Perry

Despite the differences between the two partners in scale, expectations of the outcome, and approaches towards trade, there are reasons that are more important than the differences. Based on these reasons, and other factors, the South African government realized an opportunity of gaining from this trade agreement, and also attaining its trade objectives. Some of the reasons are not necessarily economic but have an influence on the agreement. Here are some of the reasons:

- EU is by far the largest trading partner, (Table 4)
- South Africa has numerous traditional links with Europe, the UK, Netherlands and Germany. These links continued even during the years when South Africa was still sanctioned by the rest of the world;
- The size of the market offered by EU is large in terms of population, and is expected to increase as EU tries to expand by bringing in central and eastern European countries (CEEC);
- Relatively high prices in the EU (some products have higher than world prices);

- The income per capita are high, in the light that agricultural products included in the agreement are generally of high value;
- The fact that the two parties are almost within the same time zone might have been an added advantage over other countries or regions which are on the same level of development with the EU;
- Agreement on agricultural commodities might have been influenced by the seasonality factor, given that the two are on different hemispheres. This eliminates competition from domestic products and other competitors from the northern hemisphere;
- EU has one of the more cumbersome trading regimes in the world, so working to simplify the trading arrangements made logical sense.

Based on these reasons, and other factors, the South African government realized an opportunity of gaining from this trade agreement, and also attaining its trade objectives. If these objectives are realized, South Africa will have a chance to reduce the overall trade imbalance between the two parties. On the other hand, there is fear that this agreement might harm South Africa's domestic farming in the local market. This is because of high subsidies paid to farmers in the EU. So there is justified concern that EU might try to export these subsidized goods and thus put South African farmers out of business, or reduce their incomes substantially.

It is clear that trade liberalization inevitably leads to displacement of domestic production by imported goods (Reed). However, if sustained and

nurtured, the subsequent adjustment process may lead to more efficient organization of production and increased competitiveness on both the domestic and export markets (Krugman). As much as FTA offers opportunities to South African businesses, they will also have to meet competition from European Union. Whether South Africa gains or not depends on its ability to improve on export performance. EU-SA trade agreement provides an opportunity for producers to compete in one of the highly contested markets in the world after many years of isolation.

Agricultural policies of other countries

The policies of other competing countries have a role to play in determining competitiveness in the market. For example, some countries still have strong government involvement either in production or marketing while some leave market forces to determine prices and quantities traded. In both cases, the outcome of the policies might have an impact on the competition in the contested market. In this section, agricultural policies in Turkey, the U.S., New Zealand and Argentina are briefly discussed.

Turkey

The Turkish government 's involvement in agriculture is mainly through price support and payments based on input use. Support, as measured by percentage of producer subsidy equivalence (PSE), increased from the average of 19% during 1986 to 36% in 1998 (OECD (b)). The government is heavily involved in marketing of agricultural products. Export subsidies are applied to a number of products including fresh and processed fruits and vegetables. These

subsidies, which were limited to a maximum of 10% or 20 % of export value and 30% to 100 % of quantities exported, are being provided for fresh and processed fruits.

United States

Since 1996, despite the rise in production, agricultural support has decreased with reductions in all elements of support, in particular deficiency payments, which declined from 36% to 10% of total support in 1995. Market price support accounted for 49% of total support in 1995. Overall, producer prices benefiting from market price support are estimated to have fallen by 2 %. A number of trade measures were adjusted in conformity with Uruguay Round agreement. Total budgetary costs for Export Enhancement Program (EEP) fell by 70% in 1995 (OECD(b)). Reductions in EEP expenditure ceiling for 1996 fell to a level below the Uruguay Round agreement commitments, and is expected to reduce distortions in both domestic and world markets. The total value of export credit guarantee to help foreign countries finance purchase of US farm goods under the Export Credit Guarantee Program declined by 47 % in 1999.

Argentina

Since the 1990's, the Argentine government has promoted a program on privatization and deregulation (Europa). The government has become less involved in the promotion of individual commodities. Although the government does not use direct export subsidies, it does administer the export promotion programs. Argentina's farm trade takes place without practically any government intervention that affects pricing.

New Zealand

Support to agriculture in New Zealand is mainly through general budget outlays for basic research and for control of pests and diseases. Direct payments are granted for adverse climatic events and disasters. Support provided to New Zealand farmers, as measured by PSE, remains the lowest in total and in percentage terms of any country in the Organization for Economic Co-operation and Development (OECD) countries and in the world. Changes to a less supportive government were introduced in the mid 1980s. The percentage PSE rose fractionally in 1999 from just over one percent to just under two percent.

CHAPTER IV

Methods and procedures

The model

Trade models have been used to investigate import demand for agricultural products. Different import demand models (e.g. single equation, time series, simultaneous equation and others) were used in the past to estimate the response of consumers to imported goods. Among them, the almost ideal demand system (AIDS) was dominant (Lee, Seale and Jierwiriyapant, Alston et al; Sparks, Seale, and Buxton; Lee, Seale, and Jierwiriyapant; Eals and Unnevehr, Hayes, Wahl and Williams; Yang and Koo, Deaton and Muellbauer, Green, Mixon and Henneberry S.R., Lee, Brorsen and Henneberry D).

A restricted, source-differentiated, almost ideal demand system (RSDAIDS) is used in this study. The almost ideal demand system (AIDS), Rotterdam, linear and quadratic expenditure system, translog, and hybrid models with less restrictive assumptions were considered as alternatives. The Rotterdam and AIDS models have been most frequently used (Alston et al; Sparks, Seale, and Buxton; Lee, Seale, and Jierwiriyapant; Eales and Unnevehr, Hayes, Wahl and Williams; Yang and Koo). Other studies by Lee, Brown, and Seale; and Lee and Brorsen employed non-nested tests to choose the model that would best represent their respective data. However, to analyze the import demand for products differentiated by sources, this method leads to a different model for each product.

According to Armington, the problem of source differentiated AIDS (SDAIDS) is the systematic simplifying of the product demand function to a point where it is relevant to practical purposes of estimation. For example, the general Marshallian model runs through a sequence of progressively restrictive assumptions, leading to a specification of product demand function that preserves the relationship between demand, income, and prices. The fundamental modification of the basic Marshallian model is the assumption of independence. This assumption states that buyers' preferences for different products of any kind are independent of their purchases of products of another kind. For example, an increase in purchases of Chilean grapes does not change buyers' relative evaluation of New Zealand's apples.

Another assumption of the SDAIDS model is that the country's market share is unaffected by changes in the size of the market as long as relative prices in that market are unchanged. The size of the market is a function of money income and prices of various goods. Therefore, demand for a product is a function of money income, the price of each good and the price of product relative to prices of other products in the same market. The growth in market share depends on the change in the product's price relative to average change in prices in the market. Growth of the market depends mainly on changes in income and income elasticities of demand for the respective product.

Although the AIDS model has been criticized for its weakness, several studies preferred this model among others with similar characteristics. The Armington model assumes that import demands are homothetic and separable

among import sources. Thus, within a market, trade patterns change only with relative price changes, and elasticities of substitution between all pairs of products (e.g. between Chile and South African pears) are identical and constant. These are strong restrictions on demand and were rejected by several studies that have tested these assumptions using alternative models (Winters, Alston et al., Lee and Brorsen). Winters suggested AIDS as an alternative to Armington model. Alston et al. also presented the double log model and AIDS model as possible alternatives to the Armington model.

Lee and Brorsen concluded that the Armington assumptions are inappropriate for modeling agricultural import demands. Alston et al. already rejected the Armington restrictions using world cotton and wheat trade data. These restrictions also cause specification errors by omitting relevant explanatory variables, like import prices from competing sources within a group.

Lee and Brorsen tested the non-nested models of AIDS and the double model log for source differentiated U.S. beef import demands. The tests showed that both double-log import model and the AIDS model were appropriate for import demand. However, the estimated elasticities using the AIDS model were more plausible than those from double-log model. In addition, the AIDS model permitted imposing the theoretical properties of demand, while the double-log model only allowed homogeneity.

The Rotterdam model and the AIDS model are similar in many respects. Both have flexible functional forms, identical data requirements, are parsimonious with respect to number of parameters, and are linear in

parameters. Economic theory does not provide a basis for choosing between the two models. Econometric tests performed by Alston and Chalfant did not provide conclusive results about which one is better. In this study, the choice for AIDS, when compared with Rotterdam, is made arbitrarily.

Empirical applications of the AIDS model to import demand have frequently assumed either product aggregation or block separability (Yang and Koo). Under the product aggregation assumption, products are not differentiated by sources and are perceived as the same (Hayes, Wahl and Williams). Moreover, the block separability assumption among goods allows estimation of share equations for goods from different origins (Alston et al). For products that are similar and competing in the same market, the RSDAIDS is preferred. The RSDAIDS model is more general model and does not impose perfect substitutability assumptions.

Model consideration

The procedure of almost ideal demand system (AIDS)(Hayes, Wahl, and Williams; Henneberry, Piewthongngam, and Qiang; Green and Alston) is used to estimate elasticities of the import demand for fresh fruits in the European Union market (EU). The AIDS model represents a flexible complete demand system that is also theoretically plausible (Alston et al.; and Lee and Brorsen). However, empirical applications of the AIDS model to import demand assume either product aggregation, or block separability among goods, under which the demand system does not differentiate products by source (e.g., Hayes, Wahl, and Williams), and allows the model to consist only of share equations for goods

from different origins (e.g ., Alston et al.). Aggregation over products is possible if all prices to be aggregated move together by the same proportion. This assumption is too strong for in international agricultural trade (Yang and Koo).

This study uses the source differentiated AIDS (SDAIDS) model to estimate EU's import demand for fruits. The model is specified such that the product sources are differentiated without imposing block separability. The SDAIDS model includes the conventional AIDS formulations as special cases.

The Source Differentiated AIDS Model

The derivation of the AIDS model starts with an expenditure function, representing Price Independent Generalized Logarithmic (PIGLOG) preferences (Deaton and Muellbauer). For the source differentiated AIDS (SDAIDS) model, the expenditure function is rewritten to approximate the importer's behavior that differentiates goods from different origins. The expenditure function given utility u is:

(1) $$\ln[E(p,u)] = (1-u).\ln[a(p)] + u.\ln[b(p)],$$

where

(2) $$\ln[a(p)] = \alpha_0 + \sum_i \sum_h \ln(p_{i_h}) + \frac{1}{2}\sum_i \sum_j \sum_h \sum_k \gamma_{i_h j_k} \ln(p_{i_h}) \ln(p_{j_k}),$$

and

(3) $$\ln[b(p)] = \ln[a(p)] + \beta_0 \prod_i \prod_h p_{i_h}^{\beta_{i_h}},$$

where α, β, and γ are parameters. P is a vector of commodity prices, and a(p) and b(p) are functions of prices. The subscripts i and j denote goods ($i, j = 1, \ldots, n$), h and k denote products. The product refers to goods by source. For

example, grape is a good, while grapes from Chile is a product. The number of origins is not necessarily the same for all goods. Good *i* may be imported from *m* different origins, while good *j* may have *n* origins (when $i \neq j$, $h = 1,\ldots, m$, and $k = 1, \ldots, n$).

By substituting equations (2) and (3) into (1), the expenditure function can be rewritten as:

(4) $$\ln[E(p, u)] = \alpha_0 + \sum_i \sum_h \alpha_{i_h} \ln(p_{i_h}) + \frac{1}{2} \sum_i \sum_j \sum_h \sum_k \gamma_{i_h j_k} \ln(p_{i_h}) \ln(p_{j_k}) + \beta_0 u \prod_i \prod_h p_{i_h}^{\beta_{i_h}}.$$

By Shephard's lemma, the budget share of good *i* imported from origin *h* can be obtained by differentiating ln[E(*p*, *u*)] with respect to ln (p_{i_h}). Thus, the budget share (w_{i_h}) is a function of prices and utility as:

(5) $$w_{i_h} = \alpha_{i_h} + \sum_j \sum_k \gamma_{i_h j_k} \ln(p_{j_k}) + \beta_{i_h} u \beta_0 \prod_i \prod_h p_{i_h}^{\beta_{i_h}},$$

where $\gamma_{i_h j_k} = 1/2(\gamma_{i_h j_k} + \gamma_{j_k i_h})$. Solving equation (4) with respect to u and substituting in equation (5) results in the SDAIDS in expenditure form:

(6) $$w_{i_h} = \alpha_{i_h} + \sum_j \sum_k \gamma_{i_h j_k} \ln(p_{j_k}) + \beta_{i_h} \ln\left(\frac{E}{P}\right),$$

where

(7) $$\ln(P) = \alpha_0 + \sum_i \sum_h \alpha_{i_h} \ln(p_{i_h}) + \frac{1}{2} \sum_i \sum_h \sum_j \sum_k \gamma_{i_h j_k} \ln(p_{i_h}) \ln(p_{j_k}).$$

Since the price index (P) in the share equation (6) is nonlinear and provides difficulties in estimation, Stone's index is used as a linear approximation (Deaton and Muellbauer). Stone's index in this extension is ln(P) =

$\sum_i \sum_h w_{i_h} \ln(p_{i_h})$. However, this index causes a simultaneity problem since the expenditure share in the index, w_{i_h}, is also the dependent variable. To avoid this, the lagged shares (Eales and Unnevehr) will be used.

Marshallian price elasticities with the linear approximation using lagged shares are:

(8) $\varepsilon_{i_h i_h} = -1 + \frac{\gamma_{i_h i_h}}{w_{i_h}} - \beta_{i_h}$, for own-price elasticity;

(9) $\varepsilon_{i_h i_k} = \frac{\gamma_{i_h i_k}}{w_{i_h}} - \beta_{i_h}(\frac{w_{i_k}}{w_{i_h}})$, for cross-price elasticity among products; and

(10) $\varepsilon_{i_h j} = \frac{\gamma_{i_h j}}{w_{i_h}} - \beta_{i_h}(\frac{w_j}{w_{i_h}})$, for cross-price elasticity among goods.

The expenditure elasticity is given by:

(11) $$\eta_{i_h} = 1 + \frac{\beta_{i_k}}{w_{i_h}}.$$

The general demand conditions for import behavior also can be imposed or tested as for AIDS model. The conditions are

Adding-up: $\sum_i \sum_h \alpha_{i_h} = 1; \quad \sum_i \sum_h \gamma_{i_h i_k} = 0; \quad \sum_i \sum_h \beta_{i_h} = 0;$

Homogeneity: $\sum_i \sum_h \gamma_{i_h i_k} = 0;$

Symmetry: $\gamma_{i_h i_k} = \gamma_{i_k i_h}.$

Restricted SDAIDS Models

Using SDAIDS model, the import demand of different sources can be estimated if sufficient number of observations are available. However, SDAIDS model contains all product prices of different goods from different sources in each equation to be estimated. For example, three goods (e.g., grapes, pears and apples), each of which has five sources. Then there will be 17 parameters (3 x 5 prices + intercept + expenditure) in each equation, and there will be 15 equations.

The number of parameters was reduced by introducing the assumption of block substitutability, as recommended by Yang and Koo. The assumption goes as follows:

(12) $$\gamma_{i_h,j_k} = \gamma_{i_h,j}, \quad \forall k \in j \neq i.$$

This means that cross price effects are not source differentiated between products, while the cross price effects are source differentiated within a product. For example, EU's demand for South African grapes will have a source differentiated cross-price effect for grapes from other sources. However, the cross-price responses to pears and apples are not source differentiated. The block substitutability assumption enables the SDAIDS model to be written as:

(13) $$w_{i_h} = \alpha_{i_h} + \sum_k \gamma_{i_h k} \ln(p_{i_k}) + \sum_{j \neq i} \gamma_{i_h j} \ln(p_j) + \beta_{i_h} \ln\left(\frac{E}{P}\right)$$

where $\ln(p_j) = \sum_k w_{jk} \ln(p_{jk})$. In general, the RSDAIDS model has M+(N-1) + 2 parameters, while the SDAIDS model has MN + 2 in each equation, if all goods (N) have same number of import origins, M.

The expenditure elasticities in RSDAIDS are formulated the same way as in SDAIDS. The general demand conditions of adding-up, homogeneity and symmetry are also the same as in SDAIDS. Equation (13) is estimated by seemingly unrelated regressions with symmetry, homogeneity and adding up conditions imposed. Equation (13) is then tested for symmetry and homogeneity of the coefficients.

Chapter V

Results

Data and Estimation procedure

Data description

Quarterly data from 1988 through the third quarter of 2000 are used to estimate the EU fruit import model (equation 13). Quarterly data was used since it provides a better explanation of demand relationships between fruits suppliers in the northern versus southern hemispheres. Fruits imported by EU are categorized into three goods: grapes (including dried grapes), pears (and quinces) and apples. Each good is imported from different sources with different number of origins. EU imports fruits mainly from South Africa, United States, Chile, New Zealand, Argentina and Turkey.

The sample statistics of expenditure shares for each product are summarized in Table 5. Among the three fruit items, grapes were the largest import (in value), accounting for 18% of total fruit imports on average per quarter. Pear imports account for about 6%, and imports of apples account for 14%. A country was identified as an import origin if it exported over 10% of each fruit per quarter. Those countries which accounted for less than 10%, where classified under other sources.

Major import sources for grapes include Turkey and South Africa, accounting for about half of the total grape imports in the EU. Turkey appears to be one of the competitors in the northern hemisphere because of its proximity to the market. South Africa also has the largest share of any single exporter in the pear

Table 5: Summary Statistics for Quarterly Average Shares of EU Fruit Imports for 1988 – 2000.

Fruit/Country	Average shares of selected fruits	Market share for each country
Grapes	0.1831	1.0000
South Africa	0.0178	0.1906
United States	0.0130	0.1674
Chile	0.0161	0.1787
Turkey	0.0211	0.2773
Other Sources	0.1151	0.1860
Pears	0.0566	1.0000
South Africa	0.0075	0.2411
United States	0.0001	0.1085
Chile	0.0059	0.1610
Argentina	0.0084	0.2245
Other Sources	0.0338	0.2649
Apples	0.1415	1.0000
South Africa	0.0175	0.1996
United States	0.0047	0.1808
Chile	0.0149	0.1599
New Zealand	0.0166	0.1580
Other Sources	0.0877	0.3017
Other fruits	0.6188	1.0000

Source: European Union, European Commission, Brussels, Belgium

market (24%) followed by Argentina with an average share of about 22%. The main import sources for apples are nearly balanced, with South Africa and the U.S. having the highest market shares of about 20% and 18%, respectively. New Zealand and Chile have market shares of roughly 16% each, and other sources provide about 30% share.

Data sources for import values and volume include Food and Agricultural Organization (FAO) of the United Nations, South African Reserve Bank, National Department of Agriculture (NDA), World Trade Organization (WTO), European Commission, International Monetary Fund (IMF) and United

Nations Statistics Division (UNSD). Import prices for individual fruits by origin were not publicly available. Thus, a proxy for import price, the unit value obtained by dividing the value by quantity was used.

Estimation procedure

Since the EU import model in this study has three fruit items and five origins for each, the SDAIDS model would have 17 parameters (3 x 5 prices + intercept + expenditure) to be estimated in each equation. Given the sample data available (17 observations because of using the lagged Stone index), the degrees of freedom problem is serious. To increase the degrees of freedom, the RSDAIDS model with block substitutability as a maintained assumption is estimated. Now the model has nine parameters (five for products, two for other goods, plus intercept and the expenditure) for each equation (except South African equations), as a result of imposing block substitutability assumption. South African equations have ten parameters due to the inclusion of the trade liberalization variable.

Block substitutability implies that cross price effects are not source differentiated between products, while the cross price effects are source differentiated within a product. The RSDAIDS model has M+(N-1) + 2 parameters, while the SDAIDS model has MN + 2 in each equation, if all goods (N) have same number of import origins, M. The equation for grapes from other sources was dropped to avoid singularity due to adding up condition.

Endogeneity test

The expenditure explanatory variable may be endogenous because expenditures are used to compute the dependent variable in the AIDS model (LaFrance). Correlation of expenditure variable with the error term causes estimates to be biased and inconsistent. Most previous literature assumes the simultaneity is small and ignored the problem (Lee and Brorsen). The procedure is to follow Wu-Hausman test to determine if expenditure can be treated as exogenous. To perform this test, the equation for ln(E/P) in the SDAIDS model is approximated using a single equation OLS model by:

$$(14) \qquad \ln(\frac{E}{P}) = a_{ih} + \sum_{i}\sum_{h} P_{ih} \ln P_{jkt} + g_{ih} \ln(\frac{E}{P})_{t-1} + h_{ih} \ln Y_t + V_{iht}$$

where t = time, Y is the total income (GDP is used in this paper); E is the total import expenditures on the three goods (grapes, pears and apples); P is Stone's index, and V_{iht} is the random error term. The residual V_{iht} from the single equation OLS model was included in each of the RSDAIDS equations. The RSDAIDS was estimated to determine the random error effect on total import expenditures. The Wu-Hausman endogeneity test indicates that simultaneity is not a problem. The null hypothesis of no correlation between error term and expenditure variable is not rejected at 5% level of significance.

Test of Separability

A test of block separability was performed, and results are reported in Table 6. The test statistic for the null hypothesis is that grapes are separable from apples and pears is 6.90. Those for pears and apples are 11.86 and 3.67, respectively. The null hypotheses that fruit import demand can be estimated

Table 6: Test Results for Block Separability

Block Separability:
H_0: grapes are separable from pears and apples.
F = 6.90**
H_0: pears are separable from apples and grapes.
F = 11.86**
H_0: apples are separable from grapes and pears.
F = 3.67*

Note: Single and double asteriks (*) denote the significance at the 5 % and 1% levels, respectively

separately for each good are all rejected at less than 5% level of significance. Rejection of the null hypothesis for block separability implies that the demand for the three fruits should be estimated in a single demand system and not as a separate demand system for each fruit.

Misspecification Tests

Assumptions of normal distribution, no autocorrelation, parameter stability, no heteroskedasticity, and appropriateness of the functional form were tested using the misspecification test as suggested by McGuirk et al. The joint conditional mean test was used to simultaneously test parameter stability, appropriateness of functional form and independence. The joint conditional variance was used to check for dynamic and static heteroskedasticity, as well as stability of variance. The results show that these assumptions cannot be rejected at 5% level of significance. The assumption of normal distribution was tested using Kolmogorov-Smirnov test. This test checks whether random variables are normally distributed. The assumption holds at 1% level of significance.

The existence of multicollinearity among variables was tested. A commonly used rule to measure severity of is to look at the size of the correlation coefficient between the values of two variables. In this study, none of the correlation coefficients were greater than 0.9, suggesting that multicollinearity did not pose a serious problem.

Table 7: RSDAIDS model coefficient estimates for EU fruit imports

Dependent variable (Budget share of fruit imports)					
Ind. Var. Grapes	South Africa	United States	Chile	Turkey	Other
Pgsa	0.035** (0.010)	0.008 (0.005)	0.023 (0.01)	-0.0016 (0.0088)	0.056 **(0.018)
Pgus	0.027**(0.009)	0.002 (0.004)	-0.009* (0.009)	0.0081 (0.0078)	-0.005 (0.016)
Pgch	0.009 (0.012)	-0.003 (0.006)	-0.003 (0.011)	0.0008 (0.0105)	-0.005 (0.022)
Pgtk	0.035 (0.027)	-0.013 (0.013)	0.036 (0.026)	-0.0386 (0.0237)	0.029 (0.049)
Pgother	-0.138** (0.014)	0.019 **(0.007)	-0.067** (0.013)	0.0532** (0.0120)	0.017 (0.025)
Papple	-0.022**(0.007)	0.001 (0.004)	-0.014*(0.007)	0.0089 (0.0065)	-0.016 (0.014)
Ppear	0.009 (0.009)	-0.014 **(0.004)	0.053 **(0.008)	-0.0357 **(0.0076)	0.003 (0.016)
Expen.	-0.012 *(0.006)	-0.003 (0.003)	0.007 (0.006)	-0.0018 (0.0053)	-0.007 (0.011)
Trade	0.009**(0.002)				
Ind. Var. Pears	South Africa	U.S.	Chile	Argentina	Other
Ppsa	0.003 (0.003)	-0.001 (0.001)	0.003 (0.003)	0.002 (0.002)	0.010 (0.009)
Ppus	-0.001 (0.006	-0.001 (0.001)	-0.002 (0.005)	0.004 (0.004)	0.001 (0.016)
Ppch	-0.001 (0.008)	0.001 (0.001)	0.001 (0.007)	-0.001 (0.005)	0.005 (0.022)
Ppag	-0.001 (0.003)	-0.001 (0.001)	-0.001 (0.003)	0.001 (0.002)	-0.003 (0.009)
Ppother	0.02 (0.012)	0.004 (0.002)	0.01 (0.010)	0.038 **(0.007)	0.094** (0.032)
Pgrape	0.005 (0.009)	-0.001 (0.002)	0.008 (0.008)	0.003 (0.005)	0.014 (0.024)
Papple	-0.02 **(0.006)	0.002* (0.001)	-0.016** (0.005)	-0.018 **(0.004)	-0.074 **(0.015)
Expen.	-0.011** (0.004)	0.002 **(0.002)	-0.008 *(0.004)	-0.009 **(0.002)	-0.037 **(0.011)
Trade	-0.002 (0.003)				
Ind Var Apple	South Africa	U.S.	Chile	New Zealand	Other
Pasa	0.003 (0.007)	-0.001 (0.002)	-0.001 (0.007)	-0.007 (0.006)	-0.024 (0.024)
Paus	-0.016 (0.008)	0.004 (0.003)	-0.019* (0.008)	-0.013 (0.007)	-0.049 (0.030)
Pach	-0.001 (0.003)	0.002 (0.001)	-0.003 (0.003)	-0.001 (0.003)	-0.009 (0.012)
Panz	-0.004 (0.005)	-0.002 (0.002)	-0.004 (0.005)	0.002 (0.004)	-0.01 (0.018)
Paother	-0.006 (0.014)	0.004 (0.004)	0.010 (0.014)	0.015 (0.012)	0.056 (0.052)
Pgrape	0.012 (0.013)	-0.005 (0.004)	-0.005 (0.013)	0.016 (0.011)	0.010 (0.046)
Ppear	0.106 **(0.014)	-0.006 (0.004)	0.156 **(0.014)	0.126**(0.012)	0.622 **(0.05)
Expen.	0.012** (0.003)	0.001 (0.001)	0.037** (0.003)	0.02** (0.003)	0.131 **(0.012)
Trade.	-0.008 (0.004)				

Notes: In column one, P= price and Y =expenditure, g = grape, p =pear and a is apple; sa = South Africa, us = United States, ch = Chile, tk = Turkey, ag = Argentina, nz = New Zealand, other= other suppliers, Trade= dummy variable for trade liberalization policy, Ind. Var= independent variable, Expen=expenditure. Single and double asteriks (*) denote significance at the 5 % and 1 % levels, respectively, numbers in parentheses are standard errors.

Table 8: Marshallian Elasticities of EU Fruits Import Demand Using RSDAIDS Models

	Block Separable AIDS Models											
	Grape				**Pear**				**Apple**			
	S.A.	U.S.	CH	TK	S.A.	U.S.	CH	AG	S.A.	U.S.	CH	NZ
Pgsa	0.919	0.394	1.159**	-0.124								
Pgus	1.795**	-1.202**	-0.746	0.46								
Pgch	0.479	0.233	-1.179	-0.073								
Pgtk	3.518**	-0.119	1.082	-2.649**								
Ygr	0.589*	0.641**	1.332**	1.036**								
Ppsa					-0.778	-0.044	0.25	0.332				
Ppus					-0.122	-0.643	-0.117	0.513				
Ppch					-0.454	0.916	-0.024	-0.343				
Pgag					0.050	-0.425	1.876	-1.003**				
Ypr					0.210	1.962**	0.407	-0.201				
Pasa									-0.509	0.00	0.366	-0.024
Paus									-0.799*	-0.374	-0.768	-0.050
Pach									0.228	-0.007	-0.869**	0.319
Panz									0.300	-0.230	0.347	-0.170
Yap									0.827**	1.549**	2.030**	0.896**
R^2	0.890	0.612	0.860	0.490	0.608	0.567	0.567	0.878	0.762	0.380	.807	0.842

Notes: In column one: P= price and Y =expenditure, g = grape, p =pear and a is apple, sa = South Africa, us = United States, ch = Chile, tk = Turkey, ag = Argentina, nz = New Zealand. Single and double asteriks (*) denote significance at the 5 % and 1 % levels, respectively

Table 9: Hicksian Elasticities of EU Fruits Import Demand Using RSDAIDS Models

	Block Separable AIDS Models											
	Grape				**Pear**				**Apple**			
	S.A.	U.S.	CH	TK	S.A.	U.S.	CH	AG	S.A.	U.S.	CH	NZ
Pgsa	0.930	0.406	1.183*	-0.106								
Pgus	1.802**	-1.194**	-0.057	0.473								
Pgch	0.489	0.243	-1.157	-0.056								
Pgtk	3.531**	-0 106	1.110	-2.626**								
Ppsa					-0.776	-0.029	-0.116	0.513				
Ppus					-0.122	-0.641	-1.172	-0.344				
Ppch					-0.453	0.208	-0.021	-1.005				
Pgag					0.052	-0.409	1.890	3.059**				
Pasa									-0.494	0.027	0.401	-0.009
Paus									-0.795*	-0.367	-0.759	-0.046
Pach									0.240	0.016	-0.839**	0.332
Panz									0.313	-0.204	0.381	-0.155

Note Refer to table 8 footnote

Estimated Results

Parameter estimates

Parameter estimates for the model are reported in Table 7. The own-price parameters are significant for shares of South African grapes and for apples from other sources. Cross-price parameters show statistical significance in nine of the 30 parameters. All expenditure parameters in the pear model are significant, and just one in the grape model. Four of the five expenditures parameter estimates in the apple model are significant. These results show that expenditure is important in determining the import shares of fruits in the EU market.

A dummy variable for policy changes was included in the three South African equations. This dummy was equal to the value of one from the first quarter of 1995 and zero for earlier quarters. This was done to capture the impact of trade liberalization policies on the exports of these fruits. A positive sign on the coefficient of trade liberalization variable will imply that the policy had a positive impact on the exports, and vice versa for a negative sign. The results indicate that trade liberalization has significant positive effect on the budget share for grapes. The parameter coefficient for trade liberalization policy is significant at 1% level of significance. For apples and pears the parameter estimates are negative, but not statistically significant.

EU Fruit Import Demand Elasticities

The full matrix of Marshallian demand elasticities from the RSDAIDS model is presented in Table 8. Marshallian demand elasticities refer to the percentage change in quantity demanded for a product due to a percentage

change of price when demand is expressed as a function of prices and income. Except for Argentine pears, all expenditure elasticities are positive indicating that they are normal goods. All of them are significant, with the exception of pears from Argentina and South Africa. Own-price elasticity of South African grapes has a positive sign, although it is not statistically significant.

For grapes, Chile (1.332) and Turkey (1.036) have elastic expenditure elasticities. The estimation results suggest that as fruit expenditures increase, EU will import more grapes from Chile and Turkey than from the U.S. and South Africa. In the pear market, as expenditures of pears increase, EU will import more from the U.S. (1.962) than from any other source. Imports of pears from South Africa, Chile and Argentina are not affected by incomes. In the apple market, Chile is the most favored (2.030), followed by U.S. (1.549). All products in the apple market have significant expenditure elasticities.

Own-price elasticities for individual fruits from different origins are all negative (with the exception of grapes from South Africa), as theory suggests. For grapes, own-price elasticities are elastic (-1.202 for U.S, -1.179 for Chile and -2.649 for Turkey). Imports of grapes from South Africa and Chile are not affected by their own prices. Pear imports are less responsive to price changes, except in the Argentine case. Chile has the least responsive pear prices (-0.024), followed by the U.S. (-0.643), then South Africa with own price elasticity of –0.778. Argentina has a slightly elastic own-price elasticity (-1.003) in the pear market. Demand for apple imports is price inelastic as all price elasticities are less than one. Only Chile has significant own-price elasticity (-0. 869).

Cross-price elasticities reveal a type of relationship among suppliers. A significant positive cross-price elasticity between suppliers of a product indicates a competitive relationship. This implies that an increase in the price of one supplier's product will result in an increase in demand for the product from other supplier. A complimentary relationship exists between suppliers with a significant negative cross-price elasticity. This means that an increase in price by one competitor will result in a decrease in demand for another product of other supplier.

The results show evidence of substitution between South Africa and U.S. and also South Africa and Turkey in the grape market. This is contrary to the expectation, given the difference in seasonality. Another substitution is between South Africa and Chile. With both countries being in the southern hemisphere, grape products from the two countries are likely to substitute for each other. There were no statistically significant cross-price elasticities in the pear market. The only significant complimentary relationship between products is in the apple market between South Africa and U.S.

Table 9 shows Hicksian demand elasticies, but they have the same statistical conclusions as Marshallian. Hicksian demand elasticities are derived as a percentage change in quantity demanded because of a unit percent price change of a product when demand for a product is expressed as a function of prices and utility (the level of utility is held constant).

Chapter IV

Summary and Conclusions

The source differentiated AIDS model was used to estimate European Union import demand for individual fruits. The block separability over sources was rejected at conventional levels of significance. The source differentiated AIDS model specified in this study provides more details about import demand behaviors.

The SDAIDS model show that expenditures in the EU play an important role in determining variations in shares of fruit products. Prices have effects on some of the suppliers' budget shares, but to a lesser extent when compared to expenditures. South African fruit products showed very little responsiveness to their own prices. The imposition of trade liberalization policies by the South African government contributed to an increase in the budget share of grapes. When the EU-SA FTA gets in place, it is expected that it will result in an increase in the budget share for grapes.

South Africa faces competition from both the northern and southern hemisphere in the grape market, even though a lesser competition was expected from the north due to seasonality. Competition in the northern hemisphere comes from the United States and Turkey. Although the production is in different seasons, the competition might be mainly due to the importation of dried grapes. From the southern hemispheres, strong competition comes from Chile, where the production is in the same season.

The pear market shows very little responsiveness to changes in expenditures and prices. Products from all sources do not respond to expenditure and price variables, with the exception of products from the U.S. and Argentina, respectively. Results show that if pear import expenditures increase, a higher share of that increase will go to U.S. products than any other supplier. In the case of Argentina, a change in prices will result in about the same percentage change in its share of pear imports.

Chile appears to have a very strong competitive position in the apple market. According to Yang and Koo, a country is regarded as having strong export potential in an import market if demand for the product is insensitive to price changes but increases with expenditure. In the apple market, Chile is in this position, hence its competitive advantage. As EU is working on lowering prices of their commodities (if this is applied to apples), that decision will not have much impact on Chilean exports to the region.

There is evidence of complementary relationship between the South African and U.S. apples. This complementary relationship may be because of the fact that apples from South Africa and U.S. do not compete for market share during the same quarters. As the South African apples are off-season, then the EU consumers spend their expenditures on U.S. apples without negatively affecting the South African demand.

Since two of the three South African products had positive and significant expenditure elasticities, results indicate that fruit exports will increase if expenditure for these imported fresh fruits increase in the EU market. The

general results show that South African fruit producers should look for increases in fruit expenditures to expand their market share in the EU. Although expenditure elasticities suggest that an increase in import expenditures on apples and grapes will result in another increase in exports of South African respective products, the percentage increase will be less than that of market shares. South African grape producers will benefit more than producers of two other crops from the EU-SA bilateral agreement.

In all product groups, South Africa had the least expenditure elasticities with the exception of pears. This lack of competitiveness from South African products that might be attributed to many years of isolation or poor product quality compared to other products. Promotion activities need not be ignored if South Africa is to compete with countries like Chile for market shares.

The results obtained in this study indicate that trade liberalization has contributed significantly to the increase in the market share of grapes in the EU. It is expected that FTA will have price-reducing effects through tariff reductions, and thus improve South Africa's competitiveness in the EU market relative to other suppliers. It is not clear what the effects of EU-Mercosur negotiations will be on Chile's competitiveness since the talks are still continuing. The other uncertainty is brought by the fact that Chile is not a full member of Mercosur. Another supplier of fruits to the EU, Turkey, did not include agricultural commodities in its trade agreement with EU.

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